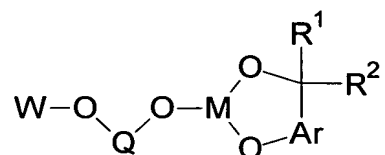


Amendment to the Claims:

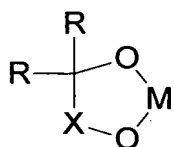
This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

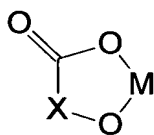
1. (original) A bis-chelating ligand composition having the generic formula:



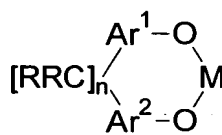
wherein M is a Group VB element selected from phosphorus (P), arsenic (As), or antimony (Sb); R¹ and R² are each independently selected from hydrogen and monovalent hydrocarbyl radicals; or alternatively, R¹ and R² are bonded together to form a hydrocarbyl or substituted hydrocarbyl diradical that taken with the methylene carbon of formula I forms a cyclic or heterocyclic ring; or alternatively, one of R¹ or R² is hydrogen or a monovalent hydrocarbyl radical, while the other of R¹ or R² is a hydrocarbyl or substituted hydrocarbyl radical bonded to an atom in the aryl group Ar to form a cyclic or heterocyclic ring; Ar is selected from 1,2-arylenes; Q is selected from the group consisting of 1,2-arylenes, 2,2'-bisarylenes and alkyl diradicals; and W is selected from the group consisting of Group VB element-containing formulas II, III, IV, and V:



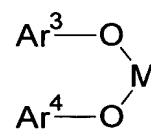
(II)



(III)



(IV)



(V)

wherein M is as defined hereinbefore; each R is independently selected from monovalent hydrocarbyl radicals; X is selected from alkyl and aryl diradicals; Ar¹ and Ar² are each independently selected from 1,2-arylenes; Ar³ and Ar⁴ are each independently selected from monovalent aryl radicals; and n in formula IV is 0 or 1.

2. (original) The composition of Claim 1 wherein each M is phosphorus (P).

3. (currently amended) The composition of Claim 1 wherein each R¹ and R² is selected from hydrogen, C₁₋₂₀ primary alkyl radicals, and substituted C₁₋₂₀ primary

alkyl radicals; or wherein R^1 and R^2 are bonded together to form a diradical that taken with the methylene carbon of formula I forms a C_{3-8} cyclic or heterocyclic ring.

4. (canceled)

5. (original) The composition of Claim 1 wherein Ar is a C_{6-20} 1,2-arylene or a substituted derivative thereof.

6. (original) The composition of Claim 5 wherein Ar is selected from the group consisting of 1,2-phenylene, 1,2-naphthylene, and 2,3-naphthylene, 3-methyl-1,2-phenylene, 3-ethyl-1,2-phenylene, isopropyl-1,2-phenylene, 3,5-dimethyl-1,2-phenylene, 3,5-diethyl-1,2-phenylene, 3,5-diisopropyl-1,2-phenylene, 3-methyl-1,2-naphthylene, and 1-methyl-2,3-naphthylene.

7. (original) The composition of Claim 1 wherein Q is selected from the group consisting of C_{6-20} 1,2-arylenes, C_{12-30} 2,2'-bisarylenes, and C_{1-20} alkyl diradicals, and substituted derivatives thereof.

8. (original) The composition of Claim 1 wherein Q is selected from the group consisting of 2,2'-biphenyl, 3,3'-di-tert-butyl-2,2'-biphenyl, 3,3'-bis(trimethylsilyl)-5,5'-di-tert-butyl-2,2'-biphenyl, 3,3',5,5'-tetra-tert-butyl-2,2'-biphenyl, 3,3'-di-tert-butyl-5,5'-dimethoxy-2,2'-biphenyl, 3,3',5,5'-tetra-tert-amyl-2,2'-biphenyl, 3,3'-di-phenyl-5,5'-di-tert-butyl-2,2'-biphenyl, 3,3'-di-tert-butyl-5,5'-bis(trimethylsilyl)-2,2'-biphenyl, 3,3'-bis(trimethylsilyl)-5,5'-bis(2,4,6-trimethylphenyl)-2,2'-biphenyl, ethylene ($-CH_2CH_2-$), 1,3-propylene ($-CH_2CH_2CH_2-$), 1,2-phenylene ($-C_6H_4-$), 1,2-naphthylene ($-C_{10}H_6-$), 2,3-naphthylene ($-C_{10}H_6-$), 3,5-dichloro-1,2-phenylene, 3,5-dibromo-1,2-phenylene, 3-iodo-5-methyl-1,2-phenylene, 3,5-diisopropyl-1,2-phenylene, 3,5,6-trichloro-1,2-phenylene, 3-phenyl-1,2-phenylene, 1,1-diethyl-1,1-methylene, 1,1-cyclohexylidene, 1,1-cycloheptylidene, and 3-isopropyl-6-methyl-1,2-phenylene.

9. (original) The composition of Claim 1 wherein each R is independently selected from hydrogen and C_{1-20} monovalent primary alkyl radicals.

10. (original) The composition of Claim 1 wherein X is selected from the group consisting of C_{1-20} alkyl diradicals, C_{6-20} aryl diradicals, and substituted derivatives thereof.

11. (original) The composition of Claim 1 wherein X is selected from the group consisting of methylene ($-CH_2-$), ethylene ($-CH_2CH_2-$), 1,3-propylene

(-CH₂CH₂CH₂-), 1,2-phenylene (-C₆H₄-), 1,2-naphthylene (-C₁₀H₆-), 2,3-naphthylene (-C₁₀H₆-), 3,5-dichloro-1,2-phenylene, 3,5-dibromo-1,2-phenylene, 3-iodo-5-methyl-1,2-phenylene, 3,5-diisopropyl-1,2-phenylene, 3,5,6-trichloro-1,2-phenylene, 3-phenyl-1,2-phenylene, 1,1-diethyl-1,1-methylene, 1,1-cyclohexylidene, 1,1-cycloheptylidene, and 3-isopropyl-6-methyl-1,2-phenylene.

12. (original) The composition of Claim 1 wherein Ar¹ and Ar² in formula IV are each independently selected from the group consisting of C₆₋₂₀ 1,2-arylenes and substituted derivatives thereof.

13. (currently amended) The composition of Claim 1 wherein Ar¹ and Ar² in formula IV are each independently selected from the group consisting of 1,2-phenylene, methyl-1,2-phenylene, ethyl-1,2-phenylene, isopropyl-1,2-phenylene, 5-tert-butyl-1,2-phenylene, dimethyl-1,2-phenylene, diethyl-1,2-phenylene, diisopropyl-1,2-phenylene, 3,5-di-tert-butyl-1,2-phenylene, 3-tert-butyl-5-methoxy-1,2-phenylene, 3-trimethylsilyl-5-tert-butyl-1,2-phenylene, 3,5-di-tert-amyl-1,2-phenylene, 3-trimethylsilyl-5-(2,4,6-trimethylphenyl)-1,2-phenylene, 3-phenyl-5-tert-butyl-1,2-phenylene, ~~1,2-naphthylene~~ 1,2-naphthyl and substituted variations of 1,2-naphthylene 1,2-naphthyl.

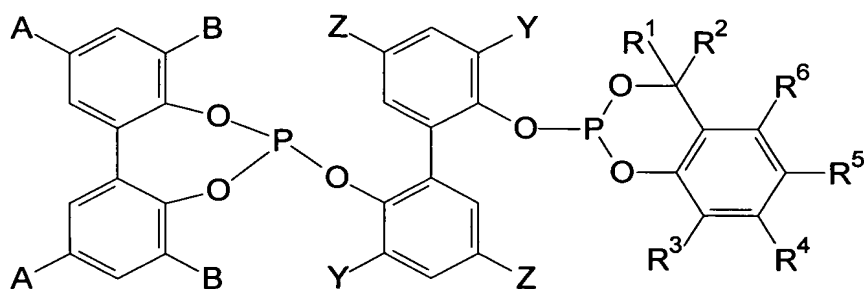
14. (original) The composition of Claim 1 wherein Ar³ and Ar⁴ in formula V are each independently selected from the group consisting of C₆₋₂₀ monovalent radicals and substituted derivatives thereof.

15. (original) The composition of Claim 1 wherein Ar³ and Ar⁴ in formula V are each independently selected from the group consisting of phenyl, tolyl, xylyl, ethylphenyl, isopropylphenyl, 2-tert-butylphenyl, 2,4-dimethylphenyl, 2,4-diethylphenyl, 2,4-diisopropylphenyl, 2,4-di-tert-butylphenyl, 2,4-dimethoxyphenyl, 2,4-di-tert-amylphenyl, 2-tert-butyl-4-methoxyphenyl, 2-trimethylsilyl-4-tert-butylphenyl, and naphthyl.

16. (currently amended) The composition of Claim 1 wherein each M is phosphorus and Q is a 2,2'-bisarylene, and wherein optionally, W is Formula IV.

17. (canceled)

18. (currently amended) The composition of ~~Claim 17~~ Claim 16 wherein each M is phosphorus; Q is a 2,2'-bisarylene; W is selected from formula IV; and n is 0, the composition being represented by the following formula:



wherein R^1 and R^2 are each independently selected from hydrogen and primary alkyl radicals, or wherein R^1 and R^2 are bonded together to form a diradical that together with the methylene carbon of formula I forms a cyclic or heterocyclic ring; R^3 , R^4 , R^5 , R^6 , A and Z are each independently selected from the group consisting of hydrogen, halogen, monovalent hydrocarbyl radicals, alkoxy radicals and tri(hydrocarbyl)silyl radicals; and B and Y are each independently selected from aryl radicals, tertiary alkyl radicals, and tri(hydrocarbyl)silyl radicals.

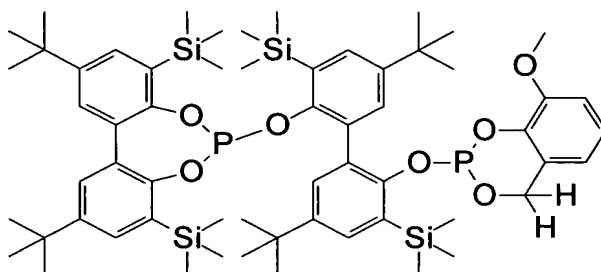
19. (currently amended) The composition of Claim 18 wherein each R^3 , R^4 , R^5 , R^6 , A and Z is independently selected from the group consisting of hydrogen, halogen (~~more preferably, chloro, bromo, iodo~~), alkyl, aryl, alkaryl, aralkyl, alicyclic, alkoxy, aryloxy, hydrocarbyl carbonyl [$-C(O)R^7$], hydrocarbyl carboxy [$-OC(O)R^7$] (wherein R^7 is a monovalent hydrocarbyl radical), and tri(hydrocarbyl)silyl radicals; the aforementioned organic, hydrocarbyl, and tri(hydrocarbyl)silyl radicals each comprising from 1 to about 20 carbon atoms.

20. (original) The composition of Claim 18 wherein each A is independently selected from hydrogen, chloro, bromo, iodo, methyl, ethyl, tertiary butyl, isoamyl, tertiary amyl, tertiary octyl, methoxy, acetyl [$CH_3C(O)-$], propionyl [$CH_3CH_2C(O)-$] and trimethylacetoxyl [$(CH_3)_3C-C(O)O-$] radicals; and each Z is independently selected from tertiary butyl, tertiary amyl, tertiary octyl, tri(methyl)silyl, tri(ethyl)silyl, xylyls, dimethylphenyls, diethylphenyls, trimethylphenyls, and trimethylacetoxyl radicals.

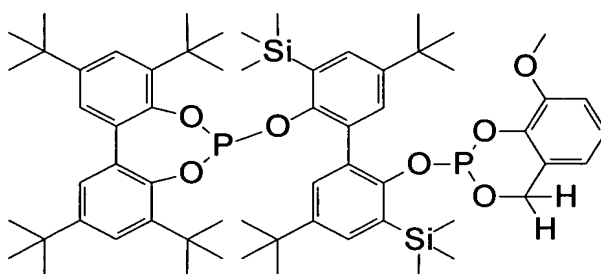
21. (original) The composition of Claim 18 wherein B and Y are each independently selected from aryl radicals, tertiary alkyl radicals, and tri(hydrocarbyl)silyl radicals having from 3 to about 30 carbon atoms.

22. (original) The composition of Claim 18 wherein each B is independently selected from tertiary butyl, trimethylsilyl, phenyl, dimethylphenyl, and trimethylphenyl radicals.

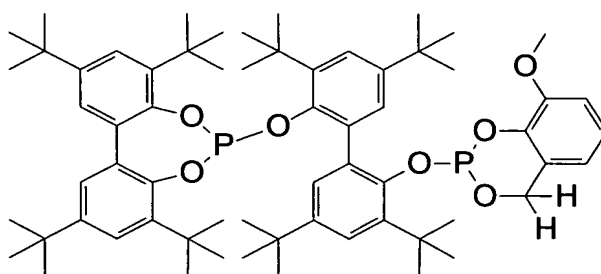
23. (original) The composition of Claim 1 being selected from the following species:



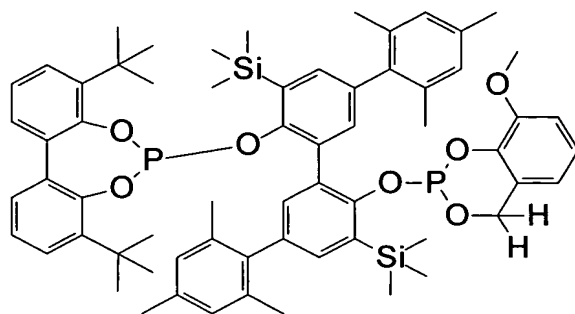
Ligand A



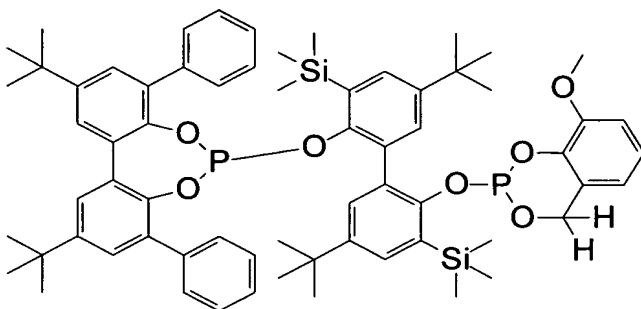
Ligand B



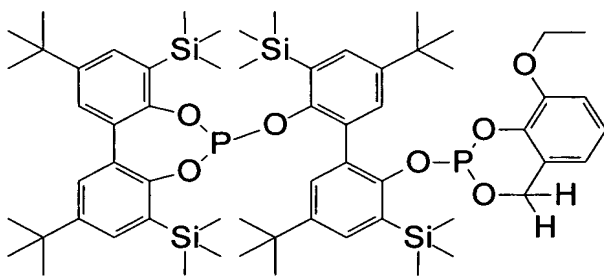
Ligand C



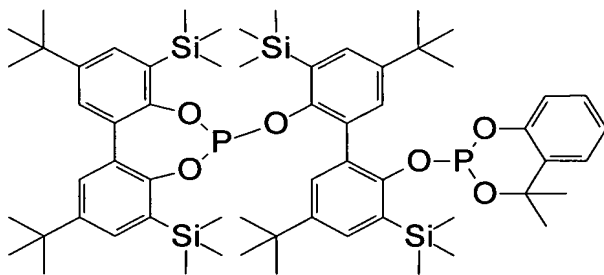
Ligand D



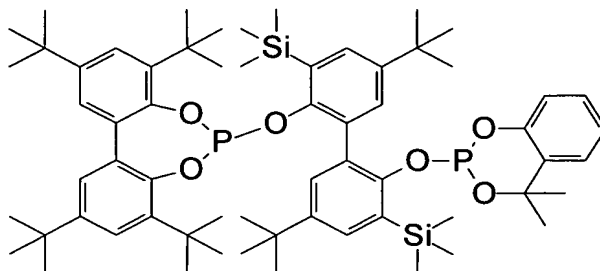
Ligand E



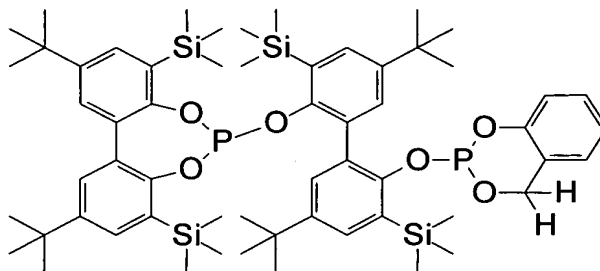
Ligand F



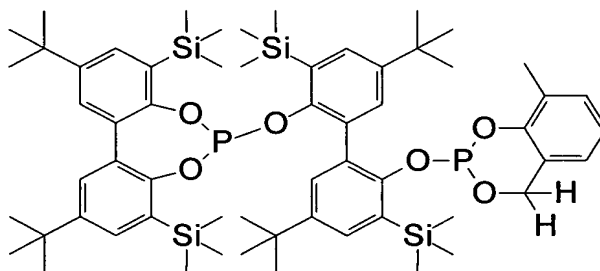
Ligand G



Ligand H



Ligand I



Ligand J

24. (original) A transition metal complex catalyst or complex catalyst precursor comprising a Group VIII transition metal bonded to at least one molecule of ligand of Claim 1, optionally, further bonded to carbon monoxide, hydrogen, or both carbon monoxide and hydrogen.

25. (currently amended) The composition of Claim 24 wherein the Group VIII transition metal is selected from ruthenium, rhodium, cobalt, and iridium; and the ligand is selected from the compositions of Claim 18.

26. (canceled)

27. (original) A solution comprising an organic solvent, free ligand, and a transition metal complex catalyst or complex catalyst precursor composition

comprising a Group VIII transition metal bonded to at least one molecule of ligand, wherein the bonded and optionally the free ligands have the formula of Claim 1.

28. (currently amended) The solution of Claim 27 wherein the Group VIII transition metal is selected from the group consisting of ruthenium, rhodium, cobalt, and iridium; and wherein the bonded and optionally the free ligands are independently selected from the group consisting of the ligands shown in Claim 18.

29. (canceled)

30. (original) A carbonylation process comprising contacting an organic compound capable of being carbonylated with carbon monoxide in the presence of a transition metal complex catalyst comprising a Group VIII transition metal bonded to at least one molecule of ligand, optionally, in the presence of free ligand; wherein the bonded and optionally the free ligands have the formula shown in Claim 1, the contacting being conducted under carbonylation conditions sufficient to prepare the corresponding carbonylated organic compound.

31. (original) The process of Claim 30 wherein the carbonylation comprises a simple carbonylation, hydroformylation, hydroacylation, hydrocyanation, hydroamidation, hydroesterification, or hydrocarboxylation.

32. (currently amended) The process of Claim 30 wherein the Group VIII transition metal is selected from ruthenium, rhodium, cobalt, and iridium; and wherein the bonded and optionally free ligands are each independently selected from the ligands listed in Claim 18.

33. (canceled)

34. (currently amended) The process of Claim 30 comprising a hydroformylation process wherein an olefinically unsaturated aliphatic hydrocarbon containing from 2 to about 60 carbon atoms and one or more unsaturated groups is contacted with carbon monoxide in the presence of hydrogen.

35. (canceled)

36. (original) The carbonylation process of Claim 34 wherein the olefinically unsaturated aliphatic hydrocarbon is selected from the group consisting of alpha olefins, internal olefins, alkyl alkenoates, alkenyl alkanoates, alkenyl alkyl ethers, and alkanols.

37. (original) The carbonylation process of Claim 34 wherein the olefinically unsaturated aliphatic hydrocarbon is selected from the group consisting of ethylene, propylene, 1-butene, 1-pentene, 1-hexene, 1-heptene, 1-octene, 1-decene, 1-dodecene, 1-octadecene, 2-butene, 2-methyl propene (isobutylene), isoamylene, 2-pentene, 2-hexene, 3-hexene, 2-heptene, cyclohexene, propylene dimers, propylene trimers, propylene tetramers, 2-ethylhexene, styrene, 3-phenyl-1-propene, butadiene, 1,3-cyclohexadiene, 1,4-cyclohexadiene, 1,7-octadiene, 3-cyclohexyl-1-butene, allyl alcohol, hex-1-en-4-ol, oct-1-ene-4-ol, vinyl acetate, allyl acetate, 3-butenyl acetate, vinyl propionate, 1-vinyl-3-cyclohexene, allyl propionate, allyl butyrate, methyl methacrylate, 3-butenyl acetate, vinyl ether, vinyl methyl ether, allyl ethyl ether, n-propyl-7-octenoate, methyl 1-decenoate, 3-butenenitrile, 5-hexenamide, methyl oleate, soybean oil and castor oil.

38. (currently amended) The carbonylation process of Claim 30 wherein the process is conducted in the presence of a solvent selected from the group consisting of saturated hydrocarbons, aromatic hydrocarbons, ethers, aldehydes, ketones, nitriles, and aldehyde condensation products; at a molar ratio of ligand to Group VIII transition metal greater than about 1.1/1 and less than about 100/1.

39. (canceled)

40. (canceled)

41. (currently amended) The carbonylation process of Claim 30 wherein the carbonylation is conducted at a process temperature greater than about 30°C and less than about 200°C and at a total pressure greater than about 1 psia (7 kPa) and less than about 10,000 psia (68,948 kPa).

42. (canceled)

43. (currently amended) The carbonylation process of Claim 30 wherein the carbon monoxide partial pressure is greater than about 1 psia (7 kPa) and less than about 500 psia (3446 kPa); and wherein in a hydroformylation process, the hydrogen partial pressure is greater than about 5 psia (35 psia) and less than about 500 psia (3446 kPa); and wherein the H₂/CO molar ratio of gaseous hydrogen to carbon monoxide is greater than about 1/10 and less than about 100/1.

44. (canceled)

45. (canceled)

46. (canceled)

47. (original) The process of Claim 1 wherein W is selected from formulas II, IV, and V.